

STD Compatible ARCNET Card Technical Features

Contemporary Control Systems' STD20 series ARCNET card is designed to work with any STD compatible product. ARCNET is a highly reliable 2.5Mbps token-passing LAN that supports all major cable medias including coax, twisted-pair, RS-485, and fiber optics.

Applicable Standards:

- Conforms to the STD bus specification
- Supports ARCNET's deterministic, 2.5Mbps token-passing protocol
- Conforms to the American National Standards' ANSI/ATA 878.1.

Cable Media Interface:

- | | |
|-----------------|---|
| - STD20-CXS | Coax low impedance (star topology) |
| - STD20-CXB | Coax high impedance (bus topology) |
| - STD20-485 | RS-485 differential driver interface |
| - STD20-FOG-ST | Fiber optic interface with ST connectors |
| - STD20-FOG-SMA | Fiber optic interface with SMA connectors |

Card Features:

- Minimal microcontroller and media interface
- Diagnostic LEDs
- Software programmable node ID
- Built-in DIP switch for optional read/set of node ID
- Full 2Kx8 dual-port packet RAM
- Command chaining for top performance
- Sequential access to RAM
- Duplicate node ID detection
- Eight, 256-byte pages allow 4 pages TX and RX
- No wait-state arbitration
- Self-reconfiguration protocol
- Supports up to 255 nodes
- Interrupt or polled operation

Contemporary Control Systems, Inc. has available "C" language software drivers for the STD20 card. These drivers are offered to simplify the integration process and are available with the order of development boards.

CCSI has available "C" language software drivers for the STD20 card. These drivers are offered to simplify the integration process and are available with the order of development boards.

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PC Compatible ARCNET Card Technical Features

Contemporary Control Systems' PCX20 series ARCNET card is designed to work with any IBM PC compatible product. ARCNET is a highly reliable 2.5Mbps token-passing LAN that supports all major cable medias including coax, twisted-pair, RS-485, and fiber optics.

Applicable Standards:

- Conforms to IBM's PC bus specification
- Supports ARCNET's deterministic, 2.5Mbps token-passing protocol
- Conforms to the American National Standards' ANSI/ATA 878.1

Cable Media Interface:

- | | |
|-----------------|---|
| - PCX20-CXS | Coax low impedance (star topology) |
| - PCX20-CXB | Coax high impedance (bus topology) |
| - PCX20-485 | RS-485 differential driver interface |
| - PCX20-FOG-ST | Fiber optic interface with ST connectors |
| - PCX20-FOG-SMA | Fiber optic interface with SMA connectors |

Card Features:

- Minimal microcontroller and media interface
- Diagnostic LEDs
- Software programmable node ID
- Built-in DIP switch for optional read/set of node ID
- Full 2Kx8 dual port packet RAM
- Command chaining for top performance
- Sequential access to RAM
- Duplicate node ID detection
- Eight, 256-byte pages allow 4 pages TX and RX
- No wait state arbitration
- Self-reconfiguration protocol
- Supports up to 255 nodes
- Interrupt or polled operation

Contemporary Control Systems, Inc. has available "C" language software drivers for the PCX20 card. These drivers are offered to simplify the integration process and are available with the order of development boards.

We also have available a development kit with source code and executable code that is designed to echo variable size packets from one ARCNET card to another while both cards are installed in the same computer. The development kit is designed to create a Lotus spreadsheet file consisting of packet sizes and transfer times.

PC Compatible ARCNET Card Technical Features

Contemporary Control Systems' PCX20 series ARCNET card is designed to work with any IBM PC compatible product. ARCNET is a highly reliable 2.5Mbps token-passing LAN that supports all major cable medias including coax, twisted-pair, RS-485, and fiber optics.

Applicable Standards:

- Conforms to IBM's PC bus specification
- Supports ARCNET's deterministic, 2.5Mbps token-passing protocol
- Conforms to the American National Standards' ANSI/ATA 878.1

Cable Media Interface:

- | | |
|-----------------|---|
| - PCX20-CXS | Coax low impedance (star topology) |
| - PCX20-CXB | Coax high impedance (bus topology) |
| - PCX20-485 | RS-485 differential driver interface |
| - PCX20-FOG-ST | Fiber optic interface with ST connectors |
| - PCX20-FOG-SMA | Fiber optic interface with SMA connectors |

Card Features:

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- Diagnostic LEDs
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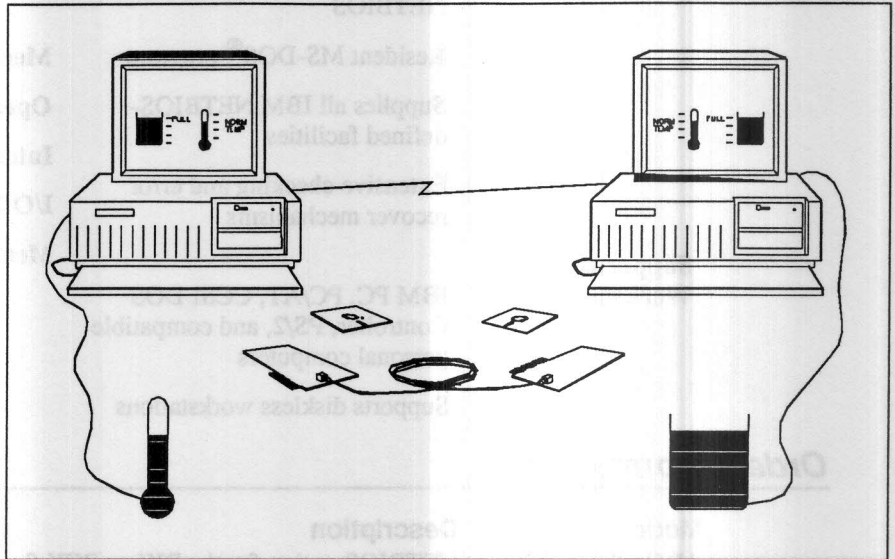
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ARC-NETBIOS

Application-to-Network Interface Software for ARCNET[®]

Benefits

- Brings ARCNET's token passing and simplified cabling to hundreds of NETBIOS-compatible application programs
- Each ARC-NETBIOS package puts a de facto standard networking interface on top of the inherent reliability of the ARCNET network interface module
- Extensive error checking and recovery mechanisms
- Supports all NETBIOS functions
- ARCNET NETBIOS can coexist on the same network with Novell's NetWare[®], Banyan's VINES[®], Datapoint's DataLAN[™], and other data networks
- Peer-to-peer NETBIOS communication is specified by many factory control software companies
- ARC-NETBIOS combines standards conformance with predictable response times
- 32KB memory requirement means more room for your application program
- An ARCNET Trade Association standard



In this simple control application, computers measure real-world conditions. The computer on the left is attached to a temperature sensor. The one on the right is attached to a level sensor. With the addition of ARCNET and NETBIOS, these computers can exchange each other's current sensor readings. Now, people can see remote conditions on the same screen as they see their local equipment. The control software provides the display. ARCNET NETBIOS provides the connectivity.

Description


ARC-NETBIOS finally brings ARCNET connectivity to the many NETBIOS-based applications for both the office and the factory.

ARCNET is well-known as the deterministic, easy-to-use, install, and maintain local area network.

NETBIOS, a programmer's interface to network communication, has become a de facto standard and is used for electronic mail, file service and database management. Recently, it has become the de facto standard for factory floor control and data acquisition programs.

ARC-NETBIOS supports all NETBIOS functions and is compatible with a wide range of hardware platforms. In the factory, laboratory or otherwise tough environments, ARC-NETBIOS can run in an IBM Electronic Gearbox or in a Contemporary Control Systems, Inc. (CCSI) DOS Controller, an industrial grade PS/2 Model 30. In the office, ARC-NETBIOS runs on IBM PCs[®], PC/ATs, PS/2s, and true compatibles.

The ARCNET/NETBIOS combination has demonstrated excellent performance in tests. Effective data rates during testing were over 200 Kilobytes per second.

 **Contemporary
Control Systems, Inc.**

Networking and Control Systems for Industry

Specifications


Performance	Data rates over 200KB per second under test conditions	Hardware Requirements	CCSI DOS Controller Engine or IBM PC, PC/AT, or equivalent processor
Functional	Requires minimal memory (32KB) for a fully functional NETBIOS		CCSI PXI or PCX series network interface module
	Resident MS-DOS [®] program	Memory	32KB
	Supplies all IBM NETBIOS-defined facilities	Operating System	MS-DOS 3.1 or later
	Extensive checking and error recover mechanisms	Interrupt Level	IRQ2
		I/O Port Range	2EO-2EF
Supported Workstations	IBM PC, PC/AT, CCSI DOS Controller, PS/2, and compatible personal computers	Memory Space	Any available and unused 16K page
	Supports diskless workstations		

Order Information

Model	Description
ARC-NETBIOS	NETBIOS option for the PXI or PCX Series Network Interface Modules

Related Products

Model	Description
Network Interface Modules	
PXI -	For IBM PC, /XT, or /AT, PS/2 models 25, 30, and 30 - 286. Based on the 90C26 ARCNET Communication Processor.
PXI-CXS	BNC Connector for RG-62/u Coaxial Cable
PXI-TPS	RJ-11 Connector for Twisted Pair IBM Type 3 Cable
PXI-FOP	HP Versatile Link Duplex Latching Connector for Plastic Fiber Optic 1000P Duplex Cabling
PXI-FOG	SMA (Standard) or ST (append -ST to order#) Connectors for Glass Fiber Optic Cable
PCX -	Functionally equivalent to the PXI series, but based on the new 90C65 processor. The PCX is smaller.
PCX-CXS	BNC Connector for RG-62/u Coaxial Cable
PCX-TPS	RJ-11 Connector for Twisted Pair IBM Type 3 Cable
PCX-FOP	HP Versatile Link Duplex Latching Connector for Plastic Fiber Optic 1000P Duplex Cabling
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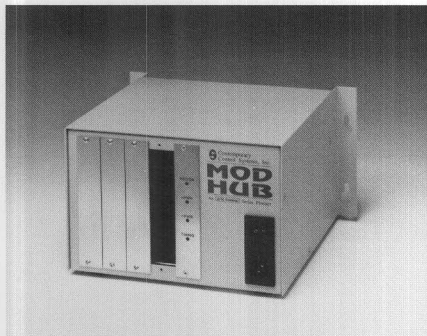
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MOD HUB series

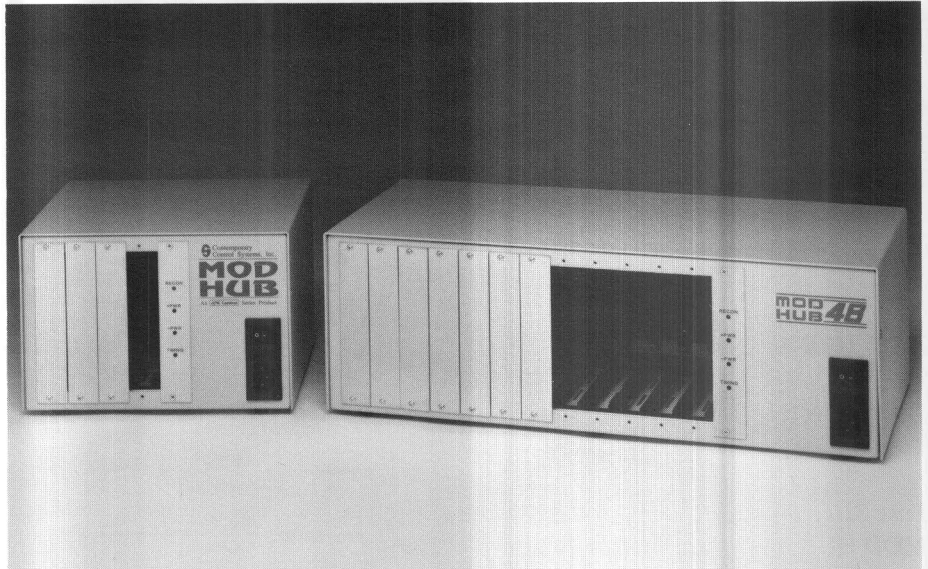
A Line of Modular Active Hubs for ARCNET® Local Area Networks

Benefits

- Compatible with the baseband ARCNET network
- Compatible with all of Contemporary Control Systems' network interface modules (NIMs)
- Supports up to 48 ports in four-port increments
- Two sizes of enclosures: 16 and 48 ports
- Offers easy expansion with plug-in modules
- Mixes coaxial, twisted-pair and glass fiber optic cable in one hub
- Isolates network faults with diagnostic LEDs
- LED indicator identifies reconfiguration of the network
- Minimizes hub jitter with precision delay line timing
- Activity LEDs for each port
- Provision for rack mounting



*MOD HUB-16F
4-slot enclosure supports up to
four expansion modules.*



MOD HUB-16 and MOD HUB-48 can be used with network interface modules to facilitate fast, reliable communication between networked devices.

Description

The MOD HUB series of modular hubs is the latest in hub design technology from Contemporary Control Systems. These 16- and 48-port hubs provide the ultimate in reliability and flexibility for cabling ARCNET networks with star configurations. The MOD HUB series can also link bus topologies by connecting the hub to one end of each bus segment.

Reliable design for worry-free operation. The hub uses low-power, low-heat CMOS components; high-efficiency LED lights; plus, a unique cooling system inherent in the design. The hub also offers network diagnostic capability using LED indicators.

LEDs aid in troubleshooting.

LEDs at each hub port identify network traffic and assist in isolating network problems while other LEDs monitor proper hub operation. An additional LED identifies when network reconfigurations occur.

Diverse enclosure styles are available.

Using the rack-mounting kit, either one 48-port or two 16-port enclosures can be mounted in a standard 19" rack. In addition, the MOD HUB-16F is a flanged unit for wall mounting and the MOD HUB-16F-N is a flanged unit in a NEMA 1 enclosure. For ease of operation, the NEMA 1 enclosure includes a power outlet mounted on the baseplate.

Flexibility is built-in. Order only the amount and type of connection you need. Six expansion modules exist, each supporting four ports. Mix and match coaxial cable, twisted-pair wire, as well as glass fiber optic cable in the same hub.

Two combination expansion modules enable mixing of two cabling types on one module. Expansion modules reside in either a 16-port enclosure (four slots) or a 48-port (twelve slots) enclosure. Ports can be easily added in the field with expansion modules.

Specifications

Mechanical

See diagram.

Environmental

Operating: 0° to +60°C
Storage: -40° to +85°C

Electrical

Input power:
MOD HUB-16 Series 120V +10/-15%
@ 0.5A 50-60 Hz;
240V +10/-15%
@ 0.25A 50-60 Hz

MOD HUB-48 Series 120V +10/-15%
@ 1.0A 50-60 Hz;
240V +10/-15%
@ 0.5A 50-60 Hz

Fuse Size:
MOD HUB-16 5mm x 20mm
MOD HUB-48 5mm x 20mm

Fuse Rating:
MOD HUB-16 115V 1A slo blo;
230V 0.5A slo blo

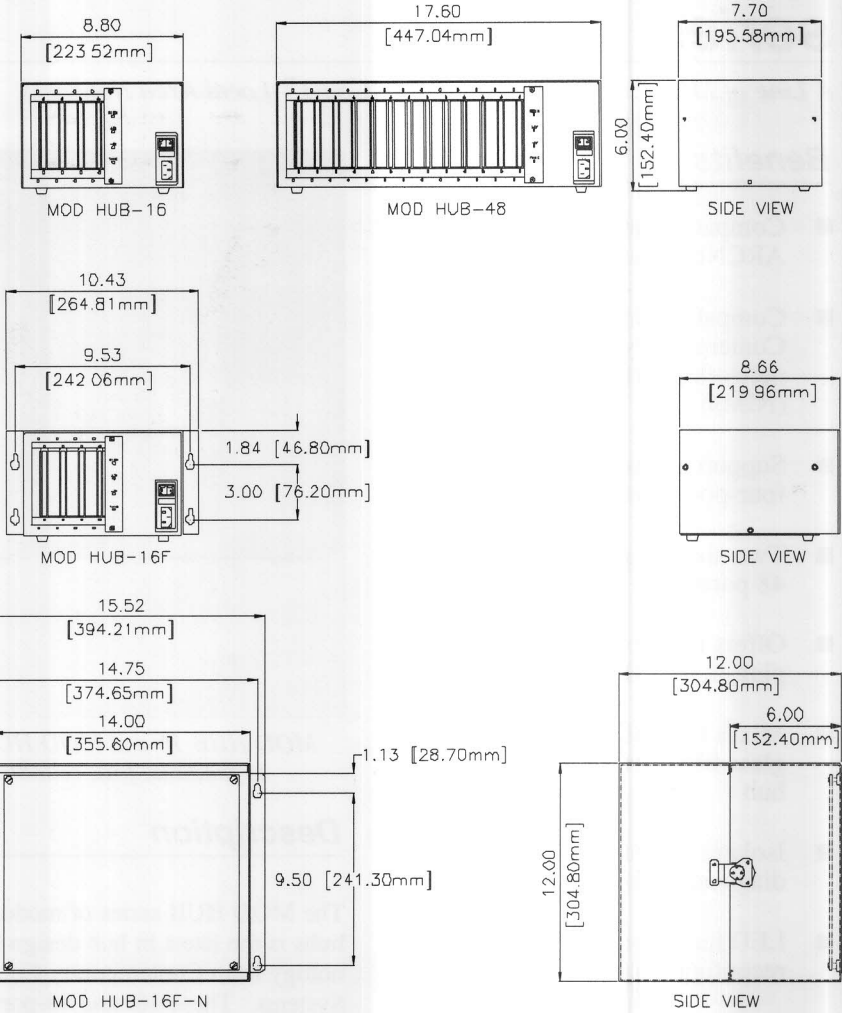
MOD HUB-48 115V 2A slo blo;
230V 1A slo blo

Agency Approvals: UL and C-UL

Ordering Information

First, order the MOD HUB enclosure size you need, allowing for 25% growth. Then, choose the particular mix of expansion modules that will fill the enclosure. Refer to the EXP data sheet for detailed information.

Model	Description
MOD HUB-16	16-pt. powered card cage (120V 50/60 Hz)
MOD HUB-16E	16-pt. powered card cage (240V 50/60 Hz)
MOD HUB-16F	16-pt. powered card cage flange mounted (120V 50/60 Hz)
MOD HUB-16EF	16-pt. powered card cage flange mounted (240V 50/60 Hz)
MODHUB-16F-N	16-pt. powered card cage flange mounted NEMA 1 enclosure (120V 50/60 Hz)
MOD HUB-48	48-pt. powered card cage (120V 50/60 Hz)
MOD HUB-48E	48-pt. powered card cage (240V 50/60 Hz)
MTG-RAK	HUB rack-mounting kit



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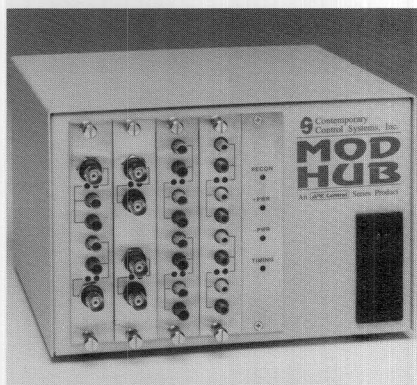
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TD401600-0DE

EXP series

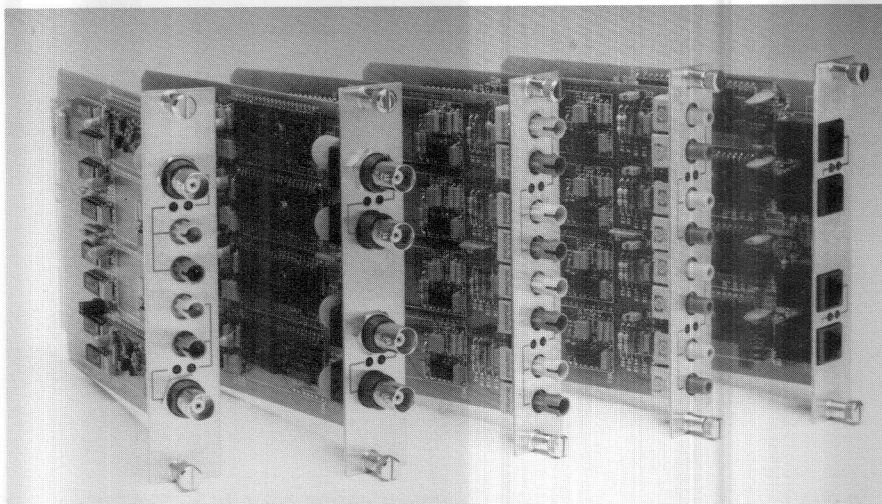
Cabling Support for MOD HUB Series of Modular Active Hubs

Benefits

- Compatible with baseband ARCNET[®] networks
- Compatible with MOD HUB series active hubs
- Three different types of cabling supported: coaxial, fiber optic and twisted-pair.
- Directly connects NIMs to a port on an active hub
- Internal BALUNs support twisted-pair cabling
- Support of either SMA or ST[™] fiber connectors
- Activity LEDs on each port isolate network faults



Four expansion modules installed in a MOD HUB-16 enclosure



EXP expansion modules support coaxial, fiber optic and twisted-pair cabling.

Description

The EXP series of expansion modules provide multi-media cabling support for the MOD HUB series of active hubs. Coaxial cable, twisted-pair wire, and glass fiber optic cable can all operate on the same network. Nine expansion modules exist, each supporting four ports. Three combination expansion modules enable mixing of two cabling types on one module. Expansion modules are selected by the cabling that they support and the cable transceiver required.

-CXS Coaxial Star

Typically, ARCNET is cabled with RG-62/u coaxial cable using BNC connectors in a star topology—each NIM connects directly to a port on an expansion module. Alternatively, RG-59u coaxial cable can be used but with lower distances allowed between a node and a hub. Coaxial star ports are also used to cascade hubs or for terminating the end of a bus segment.

-TPS Twisted-Pair Star

To drive twisted-pair cable, a BALUN must be installed at both the hub end and the NIM end. Unshielded twisted-pair wiring such as IBM Type 3 (#24 or #22 AWG solid copper twisted-pair cable) or telephone wiring are typically used. However, CCSI's twisted-pair NIMs and hubs have internal BALUNs, so external BALUNs are not needed. Connect twisted-pair cabling directly to the RJ-11 ports on the -TPS module without inversion.

-FOG Glass Fiber Optics

For longer distances, higher reliability and electrical isolation, fiber optics should be used. Two types of connectors are supported; SMA and ST. Duplex, multimode fiber optic cabling must be used in either 50/125, 62.5/125 or 100/140 micron cable. The greater the core size, the longer the distance. For simple fiber bridging to coaxial networks, select one of the mixed cabling expansion modules.

Specifications

Mechanical Each module occupies one slot in either the MOD HUB-16, MOD HUB-16F, MOD HUB-16F-N or MOD HUB-48 powered enclosures.

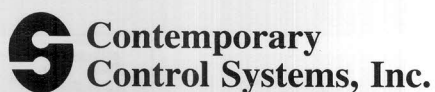
Transceiver	Description	Cable	Connectors	Cable Length	
				Min	Max
-CXS	coaxial star	RG-62/u	BNC	0	2000ft/610m
-CXS	coaxial star	RG-59/u	BNC	0	1500ft/457m
-TPS	twisted-pair	IBM type 3	RJ-11	0	330ft/100m
-FOG	duplex fiber optic	50/125	SMA or ST	0 ¹	3000ft/915m
-FOG	duplex fiber optic	62.5/125	SMA or ST	0 ¹	6000ft/1825m
-FOG	duplex fiber optic	100/140	SMA or ST	0 ¹	9000ft/2740m

¹ To obtain a zero minimum distance, a jumper option must be selected in the module.

Ordering Information

Contemporary Control Systems' MOD HUB expansion modules can be ordered by the model numbers below. The EXP-TPS module has an internal BALUN; therefore, external BALUNs are not required. If an ST connector is desired rather than an SMA, add (-ST) to the end of model number (e.g., EXP-FOG-ST).

Model	Description
EXP-CXS	4-port coaxial star expansion module
EXP-CXS/FOG-SMA	2-port coax/fiber SMA expansion module
EXP-CXS/FOG-ST	2-port coax/fiber ST expansion module
EXP-FOG-SMA	4-port fiber SMA expansion module
EXP-FOG-ST	4-port fiber ST expansion module
EXP-TPS	4-port twisted-pair expansion module
EXP-TPS/CXS	2-port twisted-pair/coax expansion module
EXP-TPS/FOG-SMA	2-port twisted-pair/fiber SMA expansion module
EXP-TPS/FOG-ST	2-port twisted-pair/fiber ST expansion module



PCX series

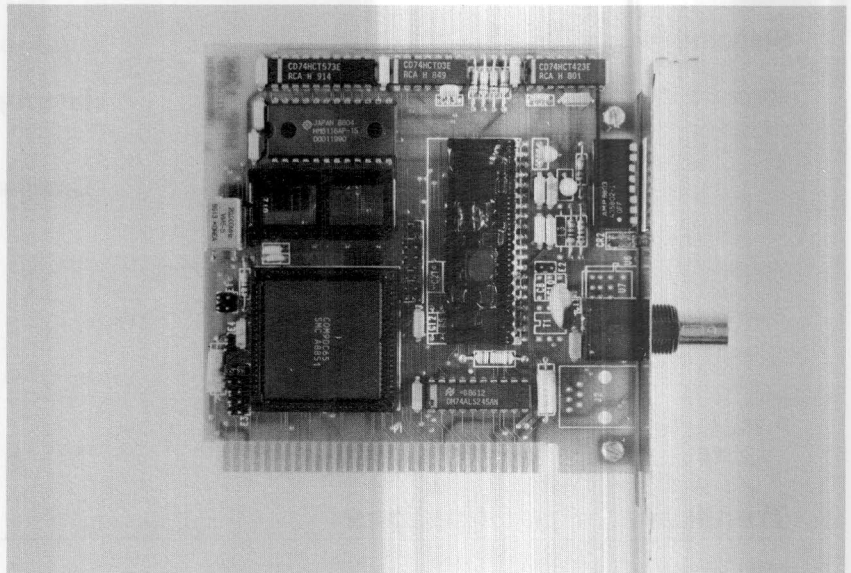
ARCNET® Network Interface Modules for PC/XT/AT (ISA) Bus Computers

Benefits

- Interfaces ARCNET with PC/XT/AT (ISA) bus computers
- One-third height PC board
- Fully-compatible with Novell's NetWare, Microsoft's Windows for Workgroups, QNX Software Systems' QNX and other popular network operating systems
- Supports coaxial, twisted-pair, or glass fiber optic cabling
- Supports 16K memory mapping, avoiding memory addressing conflicts
- Provides socket for 8K auto boot ROM
- Node address switch accessible without removing PCX from computer
- Operable with CCSI's ATA compliant NetBIOS
- CMOS design for low power consumption

Applications

- Data Acquisition
- SCADA
- Communication Gateways
- Operator Interface
- Process Control



The PCX-CXS supports coaxial cable and represents only one of four cabling options supported by the PCX series.

Description

The PCX series of ARCNET Network Interface Modules (NIMs) links PC/XT/AT (ISA) compatible computers with the ARCNET local area network.

ARCNET is classified as a token-bus LAN operating at 2.5 Mbps while supporting 255 nodes. Interfacing ARCNET to a host computer usually requires a network interface module (NIM) which plugs into the host computer's bus.

The PCX incorporates the COM9065 ARCNET controller chip and the module is compatible with all of the popular network operating systems such as Novell's NetWare, Microsoft's Windows for Workgroups and QNX Software Systems' QNX version 4.2 or greater. Jumpers are used to set the memory and I/O base addresses and the interrupt source. A graphical configuration

program is provided to assist in installation.

Every PCX module has two LEDs on the board for monitoring network operation and bus access to the module. The PCX also has an external DIP switch so that node addresses can be easily reassigned without removing the module. Interrupt lines are jumper selectable.

Four cabling types are supported by the PCX—the PCX-CXS supports coaxial cable in a star configuration; the PCX-CXB supports coaxial cable in a bus configuration; the PCX-TPS supports twisted-pair in a star configuration; and the PCX-FOG supports duplex glass fiber optic cable with either ST or SMA connectors.

Specifications

Temperature Range Operating: 0°C to +60°C
Storage: -40°C to +85°C

Dimensions 3.9" x 4.3" (one-third height
PC card)

Shipping Weight 1 lb.

Memory Mapping*

Packet Buffer:	ROM:
C000 - C180	C200
C400 - C580	C600
CC00 - CD80	CC00
D000 - D200	D200
D400 - D580	D600
D800 - D980	DA00
DC00 - DD80	DE00
E000 - E180	E200

I/O Base Addressing*

260	300
290	350
2E0	380
2F0	3E0

* I/O ports occupy 16 bytes

Interrupt Lines Supports strapping of IRQ2, 3, 4, 5 and 7

Compatibility PCX series NIMs are fully compatible with all of Contemporary Control Systems' ARCNET products and PC/XT/AT computers. CCSI's ANB-SWD allows NetBIOS systems to communicate with the PCX.

* Packet buffer occupies a 2K page and the ROM an 8K page.

Transceiver Specifications

Transceiver	Description	Cable	Connectors	Cable Length		Max Nodes/ Bus Segment
				Min	Max	
-CXS	coaxial star	RG-62/u	BNC	0	2000ft/610m	N/A
-CXS	coaxial star	RG-59/u	BNC	0	1500ft/457m	N/A
-CXB	coaxial bus	RG-62/u	BNC	6ft/2m	1000ft/305m	8
-TPS	twisted-pair	IBM type 3	RJ-11	0	330ft/100m	N/A
-FOG	duplex fiber optic	50/125	SMA or ST	0 ¹	3000ft/915m	N/A
-FOG	duplex fiber optic	62.5/125	SMA or ST	0 ¹	6000ft/1825m	N/A
-FOG	duplex fiber optic	100/140	SMA or ST	0 ¹	9000ft/2740m	N/A

¹ To obtain a zero minimum distance, a jumper option must be selected in the module.

Power Requirements

Model	+5V	-5V
PCX-CXS	150mA	15mA
PCX-CXB	150mA	50mA
PCX-FOG-SMA	220mA	N/A
PCX-FOG-ST	220mA	N/A
PCX-TPS	150mA	15mA

Order Information

Model	Description
PCX-CXS	9065 PC COAX STAR NIM
PCX-CXB	9065 PC COAX BUS NIM
PCX-FOG-SMA	9065 PC SMA FIBER NIM
PCX-FOG-ST	9065 PC ST FIBER NIM
PCX-TPS	9065 PC TWISTED-PAIR NIM

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MOD HUBplus series

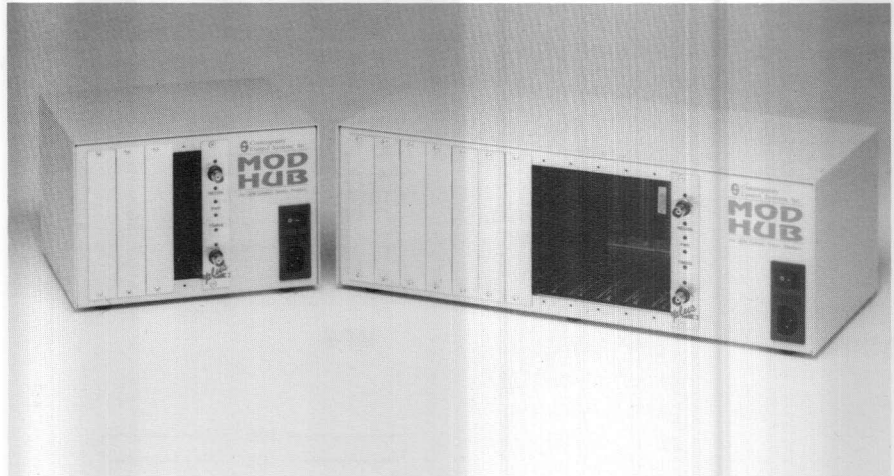
A Line of Modular Active Hubs for Specialized ARCNET® Local Area Network Applications

Benefits

- Compatible with the baseband and broadband ARCNET networks
- Compatible with all of Contemporary Control Systems' MXP expansion modules
- Offers easy expansion with plug-in modules
- Mixes baseband coaxial, broadband and long haul twisted-pair wiring
- Isolates network faults with diagnostic LEDs
- LED indicator identifies reconfiguration of the network
- Minimizes bit jitter with reclocking generator
- Two built-in coaxial star ports
- Provisions for rack mounting, wall mounting and NEMA 1 enclosure

Applications

- Data Acquisition
- SCADA
- Communication Gateways
- Machine Control
- Operator Interface
- Process Control



MHP-S and MHP-L can be used with MXP expansion modules to facilitate fast, reliable communication between networked devices.

Description

The MOD HUBplus series of modular hubs is the latest in hub design technology from Contemporary Control systems. Intended for specialized ARCNET applications, the MOD HUBplus series incorporates a first-in/first-out (FIFO) memory and reclocking generator for high jitter environments. Typical applications include broadband and long haul twisted-pair networks. Simply select the appropriate MXP expansion module for the application.


Reliable design for worry-free operation. The hub uses low-power, low-heat CMOS components; high-efficiency LED lights; plus, a unique cooling system inherent in the design. Two baseband coaxial star (-CXS) ports are resident on the hub for cascading other hubs, terminating bus segments or for direct connect to coaxial star network interface modules.

LEDs aid in troubleshooting. LEDs at each hub port identify network traffic and assist in isolating network problems while other LEDs monitor proper hub operation. An additional LED identifies when network reconfigurations occur.

Diverse enclosure styles are available. Using the rack-mounting kit, either one MHP-L or two MHP-S enclosures can be mounted in a standard 19" rack. In addition, the MHP-SF is a flanged unit for wall mounting and the MHP-SF-N is a flanged unit in a NEMA 1 enclosure. For ease of installation, the NEMA 1 enclosure includes a power outlet mounted on the inside baseplate.

Flexibility is built-in. Order only the amount and type of connection you need. Expansion modules exist that support baseband coaxial and fiber optic cabling in addition to long haul twisted-pair and broadband networks.

Anti-jitter circuitry. Extended distance ARCNET applications experience excessive jitter that cannot be accommodated by conventional active hubs. The MOD HUBplus series addresses this problem by storing received data in a FIFO and retransmitting the data using a jitter-free clock. In this way induced bit jitter is eliminated at each hub location making specialized applications such as long haul twisted-pair and broadband networks possible.

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Networking and Control Systems for Industry

Specifications

Mechanical

See diagram.

Environmental

Operating: 0° to +60°C
Storage: -40° to +85°C

Electrical

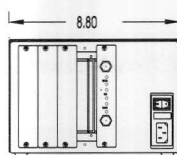
Input power:
MHP-S series 120V +10/-15%
@ 0.5A 50-60 Hz
240V +10/-15%
@ 0.25A 50-60 Hz

MHP-L series 120V +10/-15%
@ 1.0A 50-60 Hz
240V +10/-15%
@ 0.5A 50-60 Hz

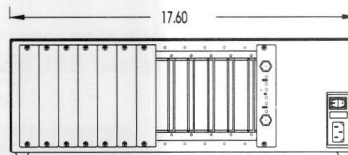
Fuse Size:
MHP-S 5mm x 20mm
MHP-L 5mm x 20mm

Fuse Rating:
MHP-S 115V 1A slo blo;
230V 0.5A slo blo

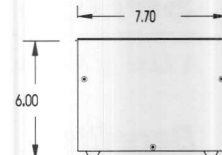
MHP-L 115V 2A slo blo;
230V 1A slo blo



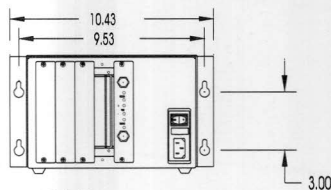
MHP-S



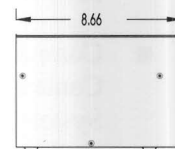
MHP-L



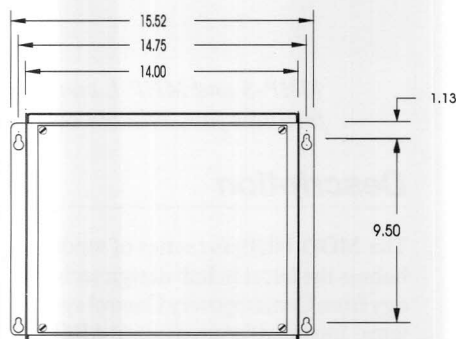
SIDE VIEW



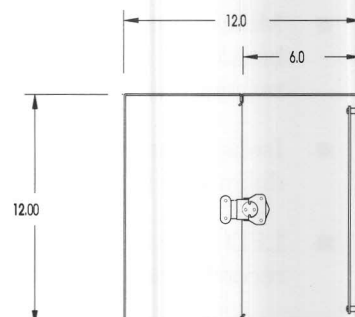
MHP-SF



SIDE VIEW



MHP-SF-N



SIDE VIEW

Order Information

First, order the MOD HUBplus enclosure size you need, allowing for 25% growth. Then, choose the particular mix of expansion modules that will fill the enclosure. Refer to the MXP series data sheets for detailed information.

Model	Description
MHP-S	4-slot powered card cage (120V 50/60Hz)
MHP-SE	4-slot powered card cage (240V 50/60Hz)
MHP-SF	4-slot powered card cage flange-mounted (120V 50/60Hz)
MHP-SEF	4-slot powered card cage flange-mounted (240V 50/60Hz)
MHP-SF-N	4-slot powered card cage flange-mounted NEMA 1 enclosure (120V 50/60Hz)
MHP-L	12-slot powered card cage (120V 50/60Hz)
MHP-LE	12-slot powered card cage (240V 50/60Hz)
MTG-RAK	HUB rack-mounting kit

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MXP-BB series

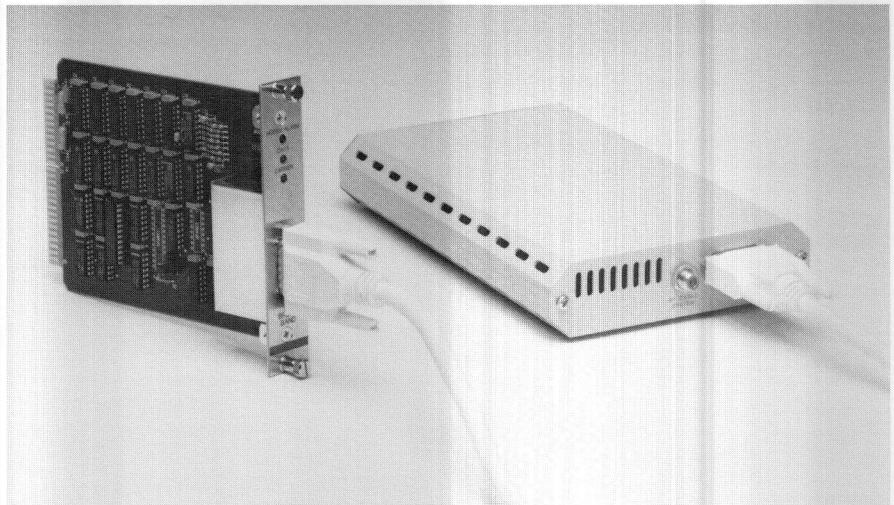
Baseband to Broadband Interface for ARCNET® Local Area Networks

Benefits

- Bridges baseband ARCNET to IEEE compliant 802.4 broadband communication systems
- Compatible with all baseband ARCNET interface modules
- Rugged industrial design for factory applications
- Diagnostic LED's for both baseband ARCNET and broadband modem traffic
- Choice of five broadband channel pairs
- Compatible with MOD HUB^{plus} high performance modular active hubs
- Supports ARCNET extended time out option for long distances
- Requires only a single 6 MHz channel pair

Applications

- SCADA
- Man Machine Interface
- Machine Control
- Process Control
- Data Acquisition



The MXP-BB consists of an expansion module, RF data modem and interconnecting cable.

Description

The MXP-BB series bridges baseband ARCNET networks to 802.4 compliant broadband based systems while maintaining 100% compatibility with all industry standard ARCNET networking hardware and software. Broadband communication systems offer the advantage of accumulating multiple voice and data systems over the same coaxial cable.

This product is ideal for applications where an existing broadband network is installed and it is desired to incorporate standard ARCNET communications over this network. Typical installations are large manufacturing facilities such as automotive plants or multi-building campus settings.

The MXP-BB consists of a broadband interface module and an RF data modem and is designed for installation into the MHP-S modular active hub. This combination allows the connection of a single ARCNET based computer to a broadband network. Only one ARCNET node can be connected to one MXP-BB baseband to broadband interface. The use of bus connected baseband ARCNET nodes or additional active hubs is not allowed. Therefore if eleven ARCNET nodes are to be connected to one broadband network, then eleven MXP-BBs must be used. Up to five channel pairs can be supported by selecting the proper RF data modem for the frequency of interest. A single digit suffix will specify the channel pair.

Specifications

Mechanical

Compatible with MHP-S occupying one slot.

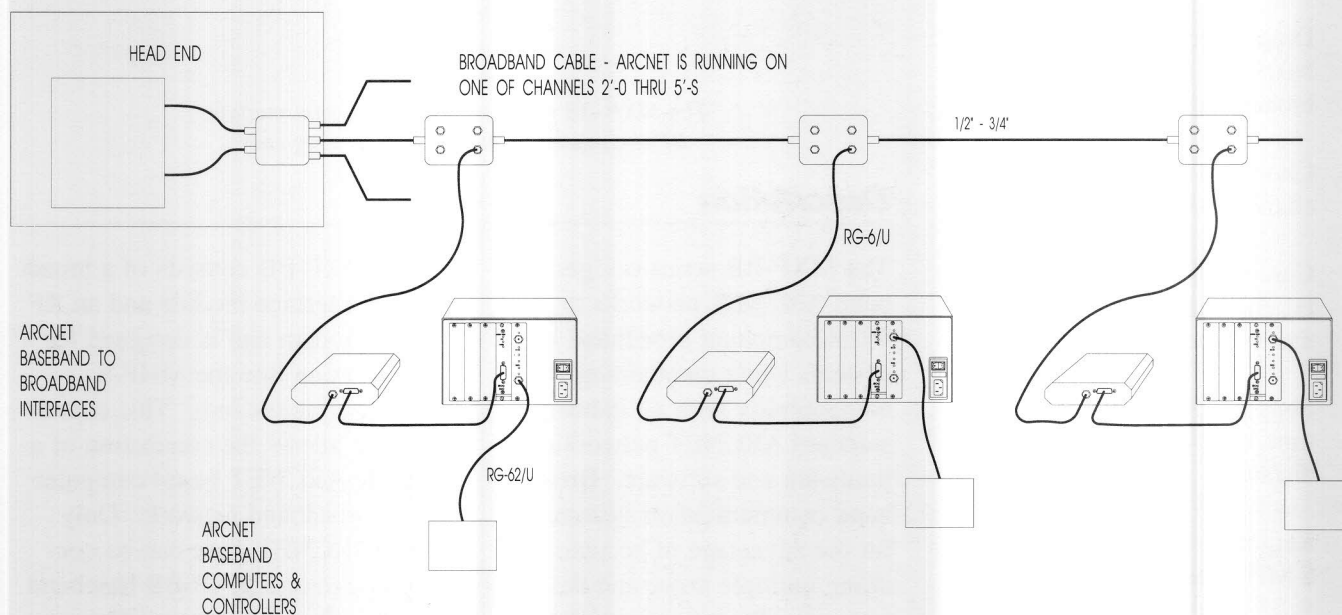
Electrical

Transmit level: +35 dBmv (min)
+50 dBmv (max)
Receive level: -10 dBmv (min)
+ 14 dBmv (max)
Connector: "F" style for use with
RG-6/u drop cable

Channel Pair Selections

Channel Pair	Transmit Frequency (MHz)	Receive Frequency (MHz)
2' to O	53.75 - 59.75	246 - 252
3' to P	59.75 - 65.75	252 - 258
4' to Q	65.75 - 71.75	258 - 264
4A' to R	71.75 - 77.75	264 - 270
5' to S	77.75 - 83.75	270 - 276

Typical Broadband System



Ordering Information

Model	Description
MXP-BBO	Broadband interface channels 2' to O
MXP-BBP	Broadband interface channels 3' to P
MXP-BBQ	Broadband interface channels 4' to Q
MXP-BBR	Broadband interface channels 4A' to R
MXP-BBS	Broadband interface channels 5' to S

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MXP-4TP

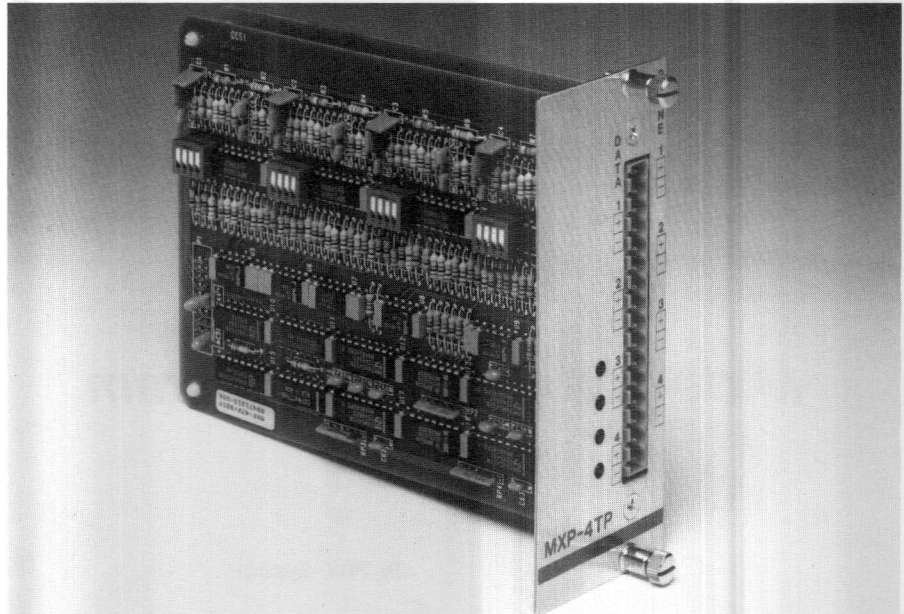
MOD HUBplus Module for Long-Haul Twisted-Pair Cable Connection

Benefits

- Increases communication distances from 300 feet up to 4000 feet using regular twisted-pair cabling
- Communication distances are switch adjustable
- Compatible with all Baseband ARCNET® Networks
- Rugged industrial design ideal for building to building connections
- Fully compatible with other cable media: single twisted-pair, coaxial and fiber optics
- Dedicated LED activity light for each pair of cable
- High-speed communications maintained over long distances

Applications

- SCADA
- Operator Interface
- Process Controls
- Data Acquisition
- Machine Control



The 4TP card makes it possible to connect ARCNET segments from 300 feet up to 4000 feet.

Description

The MXP-4TP facilitates communication from 300 to 4000 feet using twisted-pair cabling between MOD HUBplus hubs.

This hub product is ideal for those situations where there is a large amount of installed telephone cable between two or more locations, as in a college or corporate campus, a large plant or a government site. In PBX installations where no spare cables exist, piggybacking with voice circuits is possible.

An MXP-4TP is required at each end of the link. Four pairs are

necessary to support the multiplexing and demultiplexing of the ARCNET signal. Each MXP-4TP occupies two slots in a MHP-S or MHP-L enclosure.

Switches on the MXP-4TP are set to compensate for the distances involved. LED activity indicators monitor traffic on each cable pair.

Expansion to other cabling media such as single twisted-pair, coaxial and fiber optics is possible using other MOD HUBplus expansion modules.

Specifications

Mechanical

Requires two slots in a
MOD HUBplus enclosure.
Enclosures - MHP-S and MHP-L

Power Requirements

+ 5V @ 425 MA Typ
- 5V @ 120 MA Typ

Environmental

Operating 0 to 60°C
Storage -40° to +85°C

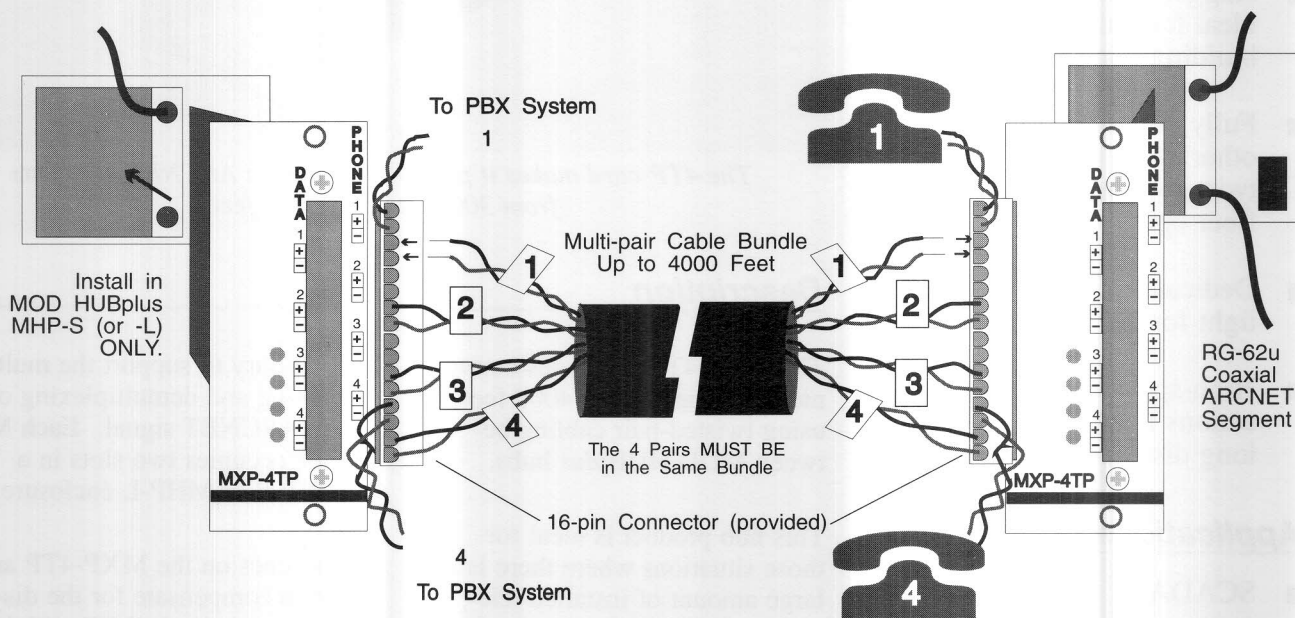
Cabling Supported

Belden's #9566
AT&T #AK-186BKMA-100

Electrical

Dielectric withstand 1500 VAC
Common mode rejection: 30dB

MXP-4TP Cabling Diagram



Ordering Information

Model	Description
MXP-4TP	Long-haul twisted-pair expansion module

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SBX20 series

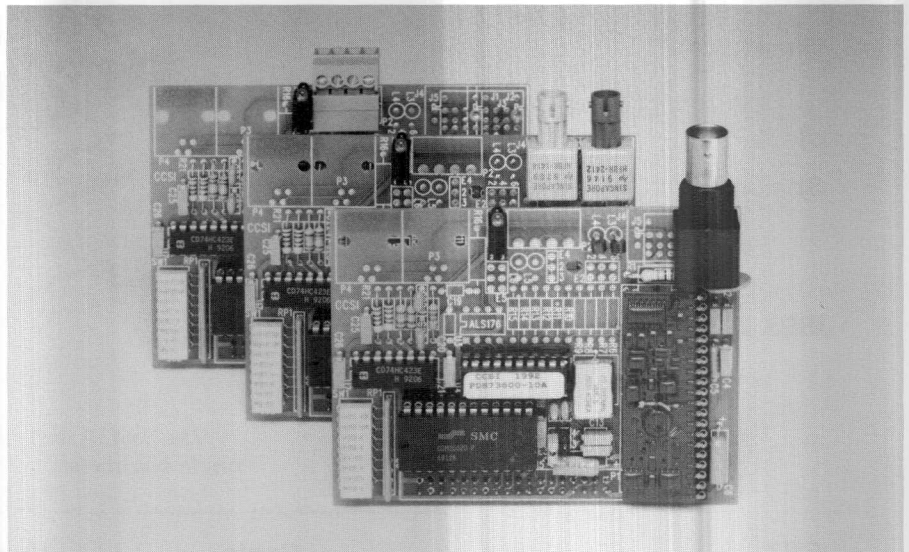
ARCNET[®] Network Interface Modules for Intel iSBX[™] Compatible Systems

Benefits

- New COM 20020 controller
- Interfaces ARCNET with single-board computers
- Uses I/O mapping
- Deterministic high speed 2.5 Mbps ARCNET token-passing local area network
- Complies with Intel's iSBX Bus Specification
- Compact 2.85" x 3.70" single-width design
- Supports SBX 8-bit and 16-bit internal architecture
- Diagnostic capabilities
- Node address switch selects one of 255 possible station addresses
- Supports coaxial, fiber optic and twisted-pair cabling including RS-485
- Compatible with CCSI's MOD HUB and Industrial Mod Hub active hubs
- All CMOS design for low power consumption

Applications

- Data Acquisition
- SCADA
- Communication Gateways
- Machine Control
- Operator Interface
- Process Control



The SBX20 offers versatility for your communication needs.

Description

The SBX20 series of ARCNET Network Interface Modules (NIMs) links single-board computers (SBCs) with the ARCNET local area network.

ARCNET is classified as a token-bus LAN operating at 2.5 Mbps while supporting 255 nodes. Interfacing ARCNET to a host computer usually requires a network interface module (NIM) which plugs into the host computer's bus. In the case of single-board computers which have no bus, a NIM solution is not possible. However, many SBCs have an on-board expansion slot which conforms to Intel's iSBX Bus Specification. Using the SBX20 ARCNET NIM, SBCs can now be linked to the ARCNET LAN via the iSBX expansion socket.

The SBX20 ARCNET NIM is a compact, low power CMOS design,

which conforms to the single-wide iSBX Multimodule Board Outline with variation (2.85" x 3.70"). However, the coaxial and fiber connectors extend beyond the board outline and raises the maximum component height of the SBX20 ARCNET NIM to 0.500" instead of the specified 0.400" height.

There are six versions of the SBX20 ARCNET NIM. The SBX20-CXS supports coaxial star configurations requiring external active or passive hubs. The SBX20-CXB supports a multidrop or coaxial bus configuration usually requiring no hubs. Other versions include the SBX20-FOG which supports fiber optic cable with either ST[™] or SMA connectors. The SBX20-TPB supports multidrop twisted-pair cabling using RJ-11 connectors while the SBX20-485 supports the RS-485 cabling standard.

Specifications

Temperature Range

Operating: 0°C to +60°C
Storage: -40°C to +85°C

Dimensions

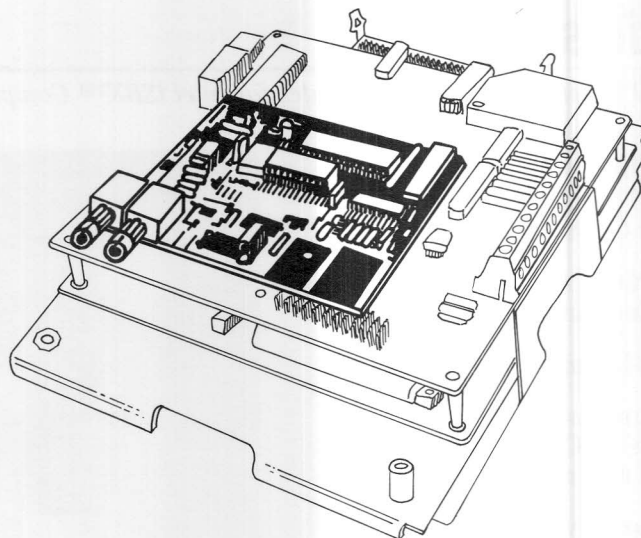
2.85"H x 3.7"W x 0.5"D

Shipping Weight

1 lb.

iSBX Bus Specification

142686-002 dated 3/81



The SBX20 series is ideal for turning stand-alone single-board computers into distributed control systems.

SBX Model	Cable Type	Cable Connectors	Maximum Cable Length	Power Requirements
SBX20-CXS	Coaxial RG-62/u	BNC	2000ft/610m	+5V, 200mA typ. -12V, 20mA typ.
SBX20-CXB	Coaxial RG-62/u	BNC	1500ft/457m *	+5V, 200mA typ. -12V, 50mA typ.
SBX20-FOG	Fiber 50/125 Fiber 62.5/125 Fiber 100/140	SMA or ST SMA or ST SMA or ST	3000ft/915m 6000ft/1825m 9000ft/915m	+5V, 300mA typ.
SBX20-TPB	Twisted-Pair Phone Wire	RJ-11	400ft/122m	+5V, 200mA typ. -12V, 50mA typ.
SBX20-485	Twisted-Pair	Screw Terminal	900ft/274m	+5V, 200mA typ.

* Subtract 72 ft. for each node added to the network segment (19 nodes maximum).

Ordering Information

Model	Description
SBX20-CXS	SBX coax star NIM
SBX20-CXB	SBX coax bus NIM
SBX20-FOG-ST	SBX ST fiber NIM
SBX20-FOG-SMA	SBX SMA fiber NIM
SBX20-TPB	SBX twisted-pair bus NIM
SBX20-485	SBX RS-485 NIM



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TD873600-0DB

PC10420 series

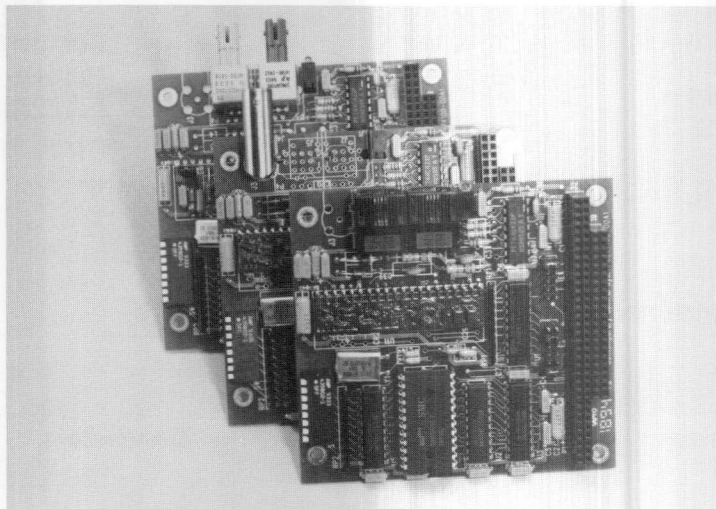
ARCNET® Network Interface Modules for PC/104™ Bus Computers

Benefits

- New COM20020 controller
- Interfaces ARCNET with PC/104 bus computers
- I/O only mapping reduces bus contention problems
- No requirement for wait-state arbitration
- Deterministic high speed 2.5 Mbps ARCNET token-passing local area network (LAN)
- Enhanced software capabilities over earlier generation ARCNET controllers
- Node address switch selects one of 255 possible station addresses
- Variable baud rates
- Supports coaxial, fiber optic and twisted-pair cabling including RS-485
- Compatible with CCSI's MOD HUB and Industrial Mod Hub active hubs
- CMOS design for low power consumption

Applications

- Data Acquisition
- SCADA
- Communication Gateways
- Machine Control
- Operator Interface
- Process Control



The PC10420 offers improved performance over earlier generation ARCNET controllers.

Description

The PC10420 series of ARCNET Network Interface Modules (NIMs) links PC/104 compatible computers with the ARCNET local area network.

ARCNET is classified as a token-bus LAN operating at 2.5 Mbps while supporting 255 nodes. Interfacing ARCNET to a host computer usually requires a network interface module (NIM) which plugs into the host computer's bus.

The PC10420 incorporates the new COM20020 ARCNET controller chip with enhanced features over the earlier generation ARCNET chips. New features include command chaining, sequential access to internal RAM, duplicate node ID detection and variable baud rates. Bus contention problems are minimized since the module only requires an I/O address. There is no requirement for wait-state arbitration.

Each PC10420 module has two LEDs on the board for monitoring network operation and bus access to the module. The PC10420 also has an external DIP switch so that node addresses can be easily reassigned without removing the module.

There are seven versions of the PC10420 ARCNET NIM. The PC10420-CXS supports coaxial star configurations requiring external active or passive hubs. The PC10420-CXB supports a multidrop or coaxial bus configuration usually requiring no hubs. Other versions include the PC10420-FOG which supports fiber optic cable with either ST or SMA connectors. The PC10420-TPB supports multidrop twisted-pair cabling using RJ-11 connectors. The PC10420-485 supports the RS-485 DC coupled cabling standard while the PC10420-485X provides transformer coupled RS-485 operation.

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Specifications

Temperature Range

Operating: 0°C to 60°C
Storage: -40°C to +85°C

Baud Rates

2.5 Mbps, 1.25 Mbps, 625 Mbps,
312.5 Kbps, 156.25 Kbps

Dimensions

3.550" x 3.775"

Shipping Weight

1 lb.

I/O Mapping

Supports I/O mapping on any 16-byte boundary

Interrupt Lines

Supports strapping of IRQ2, 3, 4, 5 and 7

Compatibility

PC10420 series NIMs are compliant with ANSI/ATA 878.1 and PC/104 Specification 2.2 dated July 1994. Interrupt sharing option is not implemented.

Transceiver Specifications

Transceiver	Description	Cable	Connectors	Cable Length		Max Nodes/ Bus Segment
				Min	Max	
-CXS	coaxial star	RG-62/u	BNC	0	2000ft/610m	N/A
-CXB	coaxial bus	RG-62/u	BNC	6ft/2m ¹	1000ft/305m	8
-FOG	duplex fiber optic	50/125	SMA or ST	0 ²	3000ft/915m	N/A
-FOG	duplex fiber optic	62.5/125	SMA or ST	0 ²	6000ft/1825m	N/A
-FOG	duplex fiber optic	100/140	SMA or ST	0 ²	9000ft/915m	N/A
-TPB	twisted-pair bus	IBM type 3	RJ-11	6ft/2m ¹	400ft/122m	8
-485	DC coupled RS-485	IBM type 3	RJ-11	0	900ft/274m	17
-485X	AC coupled RS-485	IBM type 3	RJ-11	0	700ft/213m	13

¹ This represents the minimum distance between any two nodes or between a node and a hub.

² This minimum can only be achieved by removing a jumper on the transceiver circuitry.

Power Requirements

Model	+5V	-12V
PC10420-CXS	200mA	20mA
PC10420-CXB	200mA	50mA
PC10420-FOG-SMA	300mA	N/A
PC10420-FOG-ST	300mA	N/A
PC10420-TPB	200mA	50mA
PC10420-485	200mA	N/A
PC10420-485X	200mA	N/A

Order Information

Model	Description
PC10420-CXS	20020 PC/104 coaxial star NIM
PC10420-CXB	20020 PC/104 coaxial bus NIM
PC10420-FOG-SMA	20020 PC/104 SMA fiber optic NIM
PC10420-FOG-ST	20020 PC/104 ST fiber optic NIM
PC10420-TPB	20020 PC/104 twisted-pair bus NIM
PC10420-485	20020 PC/104 DC coupled RS-485 NIM
PC10420-485X	20020 PC/104 AC coupled RS-485 NIM



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ARC DETECT™

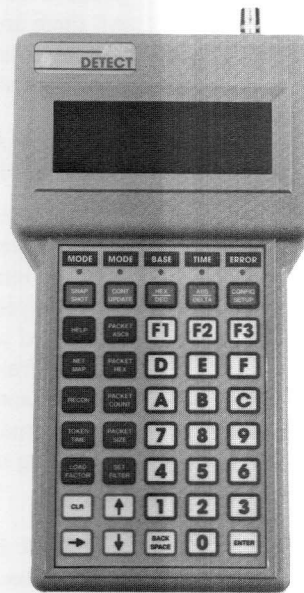
ARCNET® Network Analyzer

Benefits

- Low cost network analyzer
- Simple to use and understand
- Rugged compact handheld design
- ARCNET compatible
- Extensive diagnostic capability
- Easy to read backlit LCD display
- Optional remote PC display
- Directly supports coaxial star or coaxial bus cabling
- Carrying case for convenient storage
- Transparent operation to the network under test
- Ideal for field troubleshooting

Applications

- Plant floor troubleshooting
- Desktop network analysis
- Product development
- Network management



Analyzing ARCNET networks is simplified with the ARC DETECT network analyzer.

Description

The ARC DETECT offers sophisticated ARCNET network analysis in a compact, handheld unit and is a valuable tool in maintaining an ARCNET LAN. The operator can determine which devices are connected to the network, the content of messages being sent, who caused a reconfiguration, and network performance. Using a backlit LCD display, the operator can scroll through the analyzer's data buffer in order to study network traffic.

ARC DETECT consists of a handheld terminal with a 40 key membrane keyboard along with a 4 line by 20 character LCD display. A microprocessor and ARCNET communications controller are dedicated to capturing and storing the ARCNET traffic present on the network. Power is derived from a wall-mounted UL approved transformer. ARC DETECT is available in two models. The first model is for star networks which include active or passive hubs. The second model is directed towards bus or hubless systems although

connection to an active hub is also possible.

ARC DETECT is transparent to the network under test since it never joins the network (never participates in the token pass) yet it can examine all other nodes on the network. Since it can examine all nodes, complete traffic on the network can be analyzed including the content of packets. Using a unique filter option, only selected messages can be acquired allowing the operator to key on a particular event of significance. Because ARC DETECT is a real-time device, token rotation time can be displayed and other events can be time stamped as they occur.

An optional Windows-based PC program ARCDTECT-PC allows the ARC DETECT network analyzer to communicate to a Windows-based PC via the COM 1 port on the PC and the built-in-serial port on the ARC DETECT. Network traffic can then be displayed on a larger, more colorful monitor.

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Ten Diagnostic Functions

HELP

ARC DETECT offers the operator an on-line help mode for each of the function keys. Simply depressing the "help" key, followed by the desired function key, will yield information about that function to be displayed on the screen. Help can be accessed at any time.

NET MAP - Network Map

All active node addresses on the network are displayed. An active node is one that participates in the token pass. Nodes that are added to the network are identified with a (+) sign beside the address. Similarly, as a node leaves the network a (-) sign is appended to the address. Nodes that leave and enter networks may be the result of communication problems that degrade system performance. These problems are extremely difficult to detect but, ARC DETECT provides the clue.

RECON - Reconfiguration

A reconfiguration occurs when a node enters a network by first generating a reconfiguration burst that disrupts the normal token passing sequence. Although an inherent feature of ARCNET, excessive reconfigurations could be a result of a marginal network. ARC DETECT counts reconfigurations and displays the changes in the network map after a reconfiguration occurs.

TOKEN TIME - Token Rotation Time

The time it takes for any one node to pass the token and receive it again is called the token rotation time. ARC DETECT determines the actual token time and displays the result continuously. The maximum token rotation time is also displayed thereby indicating the worst-case response of the network. Token rotation time is an indication of the realtime performance of the network.

LOAD FACTOR - Network Performance

Network performance can be measured using three parameters:

packets/sec, bytes/sec and bits/sec. All three are displayed dynamically with the maximum amount stored and displayed along with the current value.

PACKET ASCII - Packets Displayed in ASCII

The contents of the acquired packets are displayed in ASCII format. ASCII control characters that cannot be displayed are represented by a (.). Displayed with the data are the source node address, destination node address, and packet size in either hexadecimal or decimal form depending upon the HEX/DEC selection.

PACKET HEX - Packets Displayed in Hexadecimal

The contents of the acquired packets are displayed in hexadecimal format. Also displayed with the data are the source node address, destination node address, and packet size in either hexadecimal or decimal form depending upon the HEX/DEC selection.

PACKET COUNT - Packet Count

ARC DETECT counts the number of packets transmitted or received by each node. Messages are comprised of packets and by knowing the amount of packets sent, the operator can determine which nodes are creating the most network traffic.

PACKET SIZE - Packet Size

ARCNET allows for variable length packets and ARC DETECT records the minimum and maximum length packets sent from each node. This information is handy in determining if network traffic is occurring as expected. The average length packet is displayed as an indication of throughput.

SET FILTER - Set Capture Parameters

In order to avoid the acquisition of superfluous data, data can be filtered based upon capture parameters selected by the operator. When this mode is selected, various parameters are displayed with an "XXX" designation alongside. By changing

the designations to desired values, only that data that corresponds to the designated parameters will be acquired. A particular parameter is ignored if the designation field is left as an "XXX." Parameters that can be assigned and their ranges are as follows:

Parameters	Symbol	Range
Source node address	SID	1-255
Destination node address	DID	0-255
Packet size	CNT	1-508
Buffer offset	BUFOFF	1-508
Data	VALUE	00-FF (hex)

Parameter values can be entered in either hexadecimal or decimal form depending upon the mode selected.

For example, to view all broadcast messages, set the DID to 0 and only broadcast messages will be captured. By setting the SID to 255 and DID to 0, only those broadcast messages from node 255 (decimal) will be captured. Other capture constraints are possible using this very flexible format.

F1, F2, F3 - User Functions

Three function keys have been reserved for future features or for special tests. Contact factory with any special requirements.

Five Indicators

There are five LED indicators that depict ARC DETECT's modes of operation.

MODE - located above SNAP Shot

Indicates that a single event acquisition is taking place.

MODE - located above CONT UP-DATE

Indicates that the unit is continuously acquiring data.

BASE - located above HEX/DEC

Indicates that ARC DETECT is in hexadecimal mode.

TIME - located above ABS/DELTA

Indicates that the absolute mode has been selected.

ERROR - located above CONFIG/SETUP

Indicates an error has occurred.

Five Modes of Operation

SNAP SHOT - Single Event

When this mode is selected, ARC DETECT immediately acquires data for the function selected. Once the data changes for any reason, acquisition stops; however, the display will indicate the changed data. This mode is useful when the operator desires to capture a single event. Depressing the mode button again results in another event being captured. This mode is applicable to PACKET ASCII, PACKET HEX, NET MAP and RECON functions.

CONT UPDATE - Continuous Update

In this mode, data is continuously acquired until this mode is exited. This is the normal operating mode where the display is continuously updated with the acquired data. Depressing this mode button suspends acquisition so that the operator can analyze the readings. Depressing the mode button again resumes acquisition.

HEX/DEC - Number Conversion - Hexadecimal/Decimal

Node addresses and set filter parameters can be displayed in either decimal or hexadecimal form. Each representation can be alternated by simply toggling this mode key.

ABS/DELTA - Absolute or Relative Time Stamp

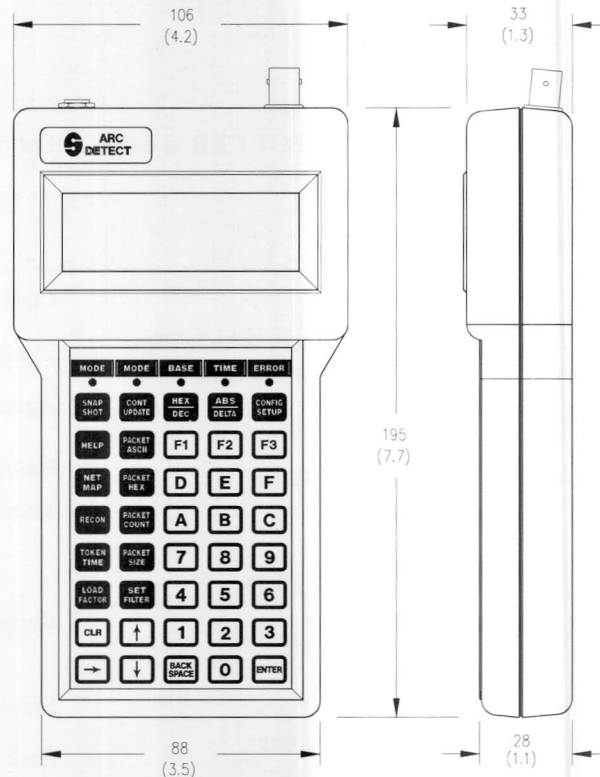
When packets are being monitored, their reception is time stamped relative to the beginning of acquisition. This is called the absolute (ABS) mode. If it is desired to display the time between packets, the relative (DELTA) mode is

selected. Each representation is displayed by simply toggling this mode key.

CONFIG SETUP - Configuration and Setup

Depressing the configuration key allows the operator to view ARC

DETECT's current configuration. Newer ARCNET technology allows for variable network speeds and ARC DETECT can be configured for different baud rates. Available baud rates are 2.5 Mbps, 1.25 Mbps, 625 Kbps, 312.5 Kbps, and 156.25 Kbps.



Connecting ARC DETECT to a Network

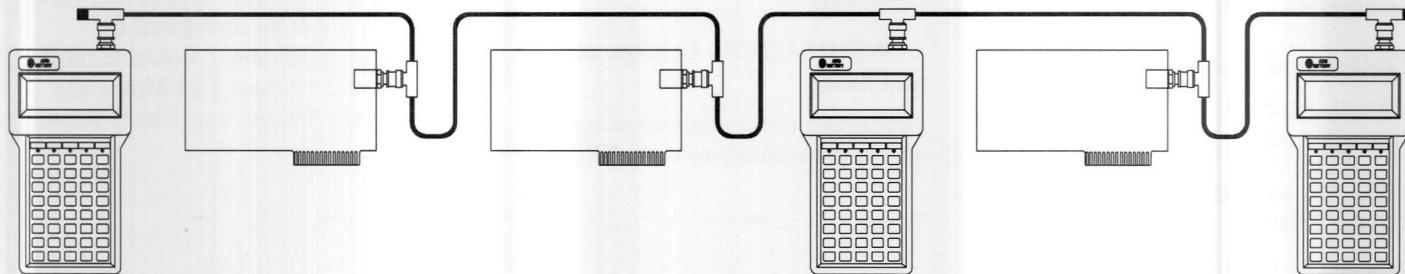
ARC DETECT is available in two models: ARCADETECT-CXS and ARCADETECT-CXB. The -CXS version is for coaxial star applications where field connections are made to an unused port on either a passive or active hub. Simply connect the 10' coaxial cable (included with the unit) to a port on the hub. On passive hubs remove the terminator attached to the unused port before connecting ARCADETECT-CXS.

The -CXB version is primarily intended for hubless systems, although it can function with active hubs. Connect a BNC "T" connector and terminator (included with the unit) to the top of the ARC DETECT. Remove the terminator at one end of the bus segment and connect a 10' coaxial cable between the ARC DETECT and the port where the

terminator was removed. ARC DETECT can also be inserted in the middle of a bus segment but without the terminator. The -CXB version can still be used with an active hub. Using the BNC "T" connector and terminator, connect the 10' coaxial cable to an unused coaxial port on the hub. The -CXB version is not recommended for use with passive hubs.

Active hubs such as CCSI's MOD HUB and MODHUB_{plus} are required for monitoring networks with either twisted-pair, long-haul twisted-pair, fiber optic or broadband segments. Simply connect either an ARCADETECT-CXS or ARCADETECT-CXB to an unused coaxial baseband port following the rules stated above.

Connection Diagram



For hubless systems, connect the ARCDTECT-CXB to either end of the bus segment along with a terminator. No terminator is used for connection within the segment.

Specifications

Carrying Case

Functional: Charcoal gray textured case with latches, handle, and inside foam protection

Material: High density polyethylene

Dimensions: 4"H x 15.5"W x 13.31"D

Shipping Carton

Dimensions: 4 1/2"H x 15.75"W x 14.25"D

Shipping Weight: 6 lbs.

Power Supply

Functional: Wall-mount plug-in, 2 prong

Dimensions: 2.95"H x 2.72"W x 1.93"D

Material: Impact resistant black thermoplastic

Electrical: Input 105-129 VAC 60Hz 0.15A
Output +5VDC 0.5A

Cord: 7' long with molded plug

Temperature: 0-40°C operating

Agency Approval: UL

Handheld Unit

Material: Case is ABS. Plastic display window and keypad overlay are a polyester-polycarbonate blend.

Keypad: 40 key embossed legend over steel snap dome

Display: 4 line x 20 characters backlit supertwist LCD

Case color: Grayhound 3501

Connectors: ARCNET via BNC (-CXB model has a white BNC housing; -CXS model has a metal BNC housing)
Power via Switchcraft #712A jack
Serial port via RJ-11

Agency Approval: FCC Part 15 Class A

Ordering Information

Included with the ARC DETECT are a wall-mount power supply, 10' RG-62/u coaxial cable, BNC "T" connector and 93 ohm terminator. Included with the ARCDTECT-CXS are the 10' coaxial cable and power supply. Included with the ARCDTECT-PC, which is distributed on a 3.5" diskette, is a 10' long serial port cable. Order by the following numbers:

Model	Description
ARCDTECT-CXS	ARCNET NETWORK ANALYZER-COAX STAR
ARCDTECT-CXB	ARCNET NETWORK ANALYZER-COAX BUS
ARCDTECT-PC	ARCNET NETWORK ANALYZER SOFTWARE
ARCDTECT-HOL	WALL-MOUNTED HOLSTER

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